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DESCRIPTIONS OF NEW SPECIES OF DIPLOMMATINÆ FROM THE KHASI HILLS,—by Major H. H. GODWIN-AUSTEN, F. R. G. S.,  
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The following descriptions will form, as regards the genus *Diplommatina*, a continuation of those, in Part II, Vol. XXXVII of the Journal, Asiatic Society, Bengal, by W. T. BLANFORD, Esq., of the Geological Survey. It is trusted, with the help of the plates, they may be of some use to collectors, when identifying species of this interesting genus. All the species here described were collected by myself within the last few years.

1. *Diplommatina Jatingana*, n. sp. Pl. I., fig. 1.

Shell dextral, ovate fusiform, solid, pale corneous; specimens, when young, often of a bright sienna, diaphanous; rather finely and sharply costulated on the four whorls near the apex, becoming fainter below, and from the ante-penultimate to the body whorl almost smooth, or with only a faint trace of ribbing; spire conic, sides flattened, apex

\* The reading of this paper was postponed by desire of the author.

rather acute, suture slightly impressed below; whorls  $7\frac{1}{2}$ , the ante-penultimate the largest; penultimate whorl slightly constricted at  $\frac{1}{4}$  turn behind the peristome, last whorl ascending chiefly behind the constriction; aperture sub-vertical, broadly curiculate; peristome solid, double, columellar margin straight, right-angled at base; the usual tooth, large, coarse and blunt, sometimes descending; lips very slightly expanded, outer more so than the inner, this last continuous, forming a strong callus upon the penultimate whorl.

Animal, pale, almost colourless, tentacles brown, labial ribbon long and tapering.

Height, 4 mm.; diameter,  $2\frac{1}{4}$  mm.; diameter of aperture, 1 mm.

*Habitat*.—Hill at the junction of the Kayeng and Jatinga rivers. N. Cachar Hills.

This is a very handsome and peculiar species, and one of the largest I have obtained in these hills; it was only found on the above isolated hill, where it was abundant. I have named it after the large river, the Jatinga, that flows below. The species is nearly allied to *D. Blanfordiana* and *D. semisculpta*: it is, however, somewhat more tumid, and has shallower sutures than either of these forms; and while it has not the distant retro-relict peristome and rimation of the former, it appears to be less sharply angulated at the base of the peristome than the latter. But the most distinctive character is the position of the slight constriction of the penultimate whorl which, instead of being in front of, or above, the aperture, as in *D. Blanfordiana*, *D. semisculpta* and *D. pachycheilus*, is at a considerable distance, about  $\frac{1}{4}$  turn behind it, (vide fig. 1a, pl. I). Hence the suture of the last whorl rises rapidly behind the constriction, runs for a short distance in front of it parallel with the preceding suture, and finally again ascends to the margin of the peristome.

## 2. *Diplommatina depressa*, n. sp. Pl. I., fig. 2.

Shell dextral, not rimate, ovate, depressed; colour light amber, tinged rubescent at apex; costulation throughout close but sharply defined, more distant on body whorl; spire conoidal, apex blunt; suture deeply impressed; whorls 5, sides with considerable con-

vexity, ante-penultimate much the largest and tumid; last whorl rises on the penultimate, almost to the suture, contracting the breadth of latter excessively; aperture vertical, broadly auriculate; peristome solid, double, the outer lip thick and strong, interrupted; the inner continuous, spreading in a broadly appressed parietal callus upwards on the sinistral side; columellar tooth large and thick; base prominent, descending.

Operculum and animal not observed.

Height,  $1\frac{1}{2}$  mm.; diameter,  $\frac{3}{4}$  mm.; diameter of aperture,  $\frac{1}{3}$  mm.

*Habitat*.—Woods at Jawai, Jaintia Hills; also at Lailangkote, about 4000 feet, where the specimens were larger.

The small size, few whorls, impressed suture, obtuse apex &c. distinguish this form readily. As in the preceding species, the last whorl rises rapidly on the penultimate, and to a greater extent than in most species of this genus. In all these characters, it exhibits a nearer approach to *Opisthostoma* than any species of *Diplommatina* yet described.

### 3. *Diplommatina Sherfaiensis*, n. sp. Pl. I., fig. 3.

Shell dextral, ovate, fusiform, sub-rimate, thin, rubescent straw colour, diaphanous; sculpture very fine, close, filiform, shewing well on all the whorls; spire with sides slightly convex, apex sub-acuminate, conic; whorls 6, convex, penultimate and ante-penultimate of very nearly the same size, the former being slightly the largest and more tumid; last whorl constricted in front of peristome above the aperture, ascending; aperture sub-vertical, columellar margin much rounded, the tooth very small, and in some old specimens is hardly to be detected; peristome thin, double and close, the outer very slightly expanded, the inner distinctly so, continuous, forming a thin broad parietal callus. Animal not observed.

Height, 3 mm.; diameter,  $1\frac{3}{4}$  mm.; diameter of aperture,  $\frac{3}{4}$  mm.

*Habitat*.—On the highest ridges of the north Cachar hills, particularly the peaks "Sherfaisip" and "Marangksi," about 5,500 feet, in dense forest; I have named it after the former, a culminat-ing point of the range.

In figure 3*b*, of this species, the constriction on the penultimate whorl has been shewn. When looking over a large number of

shells of this genus, it is found to be a common feature in many species, but is not always visible, and more apparent and commoner in some species than in others. In form and size this species much resembles *D. Puppensis*, W. Bl f., but is readily distinguished by its fine close costulation, and by the roundness of the aperture, (which is not angulated as in the above and many other species,) and by the thinness of the peristome.

#### 4. *Diplommatina polypleuris*, var., Pl. I., fig. 4.

*D. polypleuris*, Benson, Journ. Asiat. Soc. Bengal, Vol. XXXVII, Pt. II, 1868, p. 83, Pl. iii, fig. 1.

Shell dextral, ovate, cylindrical, not rimate, rather thick, pale amber colour, subtranslucent, regularly, deeply and rather closely costulated throughout; spire with sides elevately conoid, apex blunt; whorls  $6\frac{1}{2}$ , convex, suture deeply impressed; the difference between the size of the penultimate and ante-penultimate is scarcely appreciable, and those towards apex decrease very regularly; last whorl scarcely ascending; aperture vertical, circular; peristome double, moderately thick; outer and inner lip equally developed, outer expanded angulate at the base of the columella; the inner straight, continuous over the penultimate whorl in a thin narrow callus; constriction in front of aperture. Animal not seen.

Height,  $1\frac{1}{2}$  mm., diam.  $\frac{2}{3}$  mm.; diam. of aperture,  $\frac{1}{3}$  mm.

*Habitat*.—North Cachar and north Jaintia hills, in damp woods.

This peculiar variety is distinguished from *D. depressa*, which is of about the same size, by its cylindrical form, its greater thickness and opacity, and by its comparative regularity of form, the last whorl scarcely ascending on the penultimate.

The specimen figured has the columellar tooth but slightly developed, in others it is seen much larger and pointed.

#### 5. *Diplommatina Jaintiaca*, n. sp.

*Diplomm.* n. sp., Journ. Asiat. Soc., Bengal. Vol. XXXVII, Pt. II, Pl. iii, fig. 3.

Shell sinistral, elongately ovate, rather tumid, sub-rimate, rich amber colour, sharply very regularly and distantly costulated,



rather solid; spire conical, slightly convex; whorls  $5\frac{1}{2}$ , sides convex, suture deep, penultimate whorl largest, last whorl strongly constricted in front of the aperture, rising very slightly behind the peristome, chiefly between the inner and outer peristome; aperture slightly oblique, sub-circular; peristome double, inner slightly expanded, scarcely thickened, terminating in a sinuation at the base of the columella; outer greatly produced, expanded, continuous; parietal callus thin, moderately extended; columellar tooth blunt, moderately developed.

Height,  $2\frac{3}{8}$  mm., diameter,  $1\frac{1}{2}$  mm., diameter of aperture with peristome,  $\frac{2}{3}$  mm.

*Habitat*.—Locally plentiful in damp woods near Jawai, Jaintia hills, at about 4500 ft. elevation;—very rare in west Khasi Hills where only one specimen was found.

This species is very near *D. gibbosa*, from the same region, described by Mr. W. T. Blanford, and thus affording a second instance of a type intermediate between the dextral forms *D. pachycheilus*, *D. diplocheilus*, &c., and the sinistral forms of the Solomon Isles, &c. It is distinguished readily from *D. gibbosa* by its more regularly ovate form, its costulation, and the even, non-sinuated margin of the inner peristome.

Since the transmission of specimens of *Diplommatina*, published in the Journal for 1868, to Mr. W. T. Blanford, I have been fortunate enough to discover this species again. As the above quoted figure, on pl. iii, of the "Contributions to Indian Malacology, No. IX." was taken from a single shell, subsequently broken, the species remained unfortunately unnamed and undescribed. *D. gibbosa* I have found at Teria Ghat, but it is very rare in that locality, so rich in genera of other land shells.

## 6. *Diplommatina parvula*, n. sp. Pl. I, fig. 5.

Shell dextral, ovate, tumid, depressed, thin; colour bright corneous, pale in some specimens, translucent, finely yet sharply costulated throughout; spire oval, apex very flat, and blunt. Whorls 5, with sides very concave, enlarging rapidly from the apex, antepenultimate the largest, body whorl ascends slightly within a short distance of the peristome, suture deeply impressed; aperture

circular with slight obliquity, columellar margin rounded, the usual tooth absent; peristome strong, well developed, double, both outer and inner lips expanded, the former to the greatest extent, the latter forming a thick parietal callus.

Height, 0.065 inch, ( $1\frac{1}{2}$  mm.); thickness, 0.035, (1 mm.)

*Habitat*.—Moyong on north face of Khasi hills, not very plentiful.

This shell was found during the field Season 1866-67, and I am sorry that owing to some oversight it was not included among the *Diplommatinæ* sent to Mr. W. T. Blandford, whose description would have been so much more perfect. I have retained the name *parvula*, being the one selected by him, on inspection of a drawing of the shell.

#### 7. *Diplommatina insignis*, n. sp. Pl. II, fig. 1.

Shell sinistral, acuminate oval, colour corneous or pink, costulation close and strong on the upper whorls, obsolete on the two last; spire rather pointed. Whorls 8, lower rounded, at apex flat-sided; penultimate the largest, the constriction of this last situated in front and covered by the parietal callus; suture impressed, aperture vertical, oval; peristome double, outer much thickened, inner continuous, callus strong; columellar margin rounded, the tooth-like process moderate.

Operculum, thin, spiral, no boss at the back. Animal pale colored, tentacles, black, rostrum pink; the body spotted with black which shews through the shell in fresh specimens.

Height 0.27 inch.; diam. 0.13 inch.; diam. of ap. with peristome 0.10 inch.

*Habitat*.—In the forests of Burrail range, at about 3000 feet, Asalu, particularly the forest near Garilo or Chota Asalu.

This fine sinistral form is up to the present time the largest known species from India. It is a well marked shell, and differs widely from the other sinistral species from these hills, three of which are now known, *D. gibbosa* W. Blandf., *D. Jaintiaca*, God.-Aust. and the above,

#### 8. *Diplommatina tumida*, n. sp. Pl. II, fig. 2.

Shell dextral, ovately and tumidly fusiform, color pale corneous, or pale green; costulation fine and close throughout; spire attenuate,

rather pointed. Whorls 8, lower tumid, sides rounded below, flat above, penultimate the largest; suture impressed,—a well marked constriction of penultimate whorl situated close behind the peristome, last whorl rises slightly on the penultimate; aperture vertical, circular, columellar, margin rather straight, tooth large, peristome double, moderately thickened and continuous, forming a callus on the penultimate.

Height 0.23; diam. 0.13; diam. of ap. with peristome, 0.07.

*Habitat*.—Burrail range near Nenglo, N. Cachar hills, in forest, and as usual among decaying leaves.

This species is a close ally of *D. pachycheilus*, B s., partaking also somewhat of the character of *D. Blanfordiana*, but tis a more tumid form, and particularly the position of the constriction separates it well from both those shells.

Fifteen species of *Diplommatina* are now known from these hills alone, and when the Garo hills have been explored, and the higher portions of the Burrail and Patkoi ranges, Munipúr, &c., we may expect more additions. Even now it establishes this region as quite a centre of the genus, though I think it very possible many species have escaped observation in other places, from the small size and difficulty in finding these shells.

#### ADDITIONAL NOTES ON *Diplommatinæ*, *Alycaeus*, and *Pup. imbricifera*.

On almost all the species of *Diplommatina* that I have examined a constriction of the penultimate whorl is to be found, and in the larger species it is very well developed. This constriction of the whorl marks of course the position of the operculum when the animal is fully withdrawn into the shell, and the operculum of dead specimens is also to be found at this point. It would appear from an examination of these shells, that the constriction also marks the commencement of the formation of the columellar tooth. Behind the constriction the inside of the whorl appears thicker and is much more polished; with the constriction this contracts, leaves the outer surface of the shell and continues as a rim, like the sharp thread of a screw, running down and round the columella, terminating on the columellar margin of the peristome in the more

or less blunt tooth-like process, characteristic of the genus. Situated also at the constriction on the roof of the whorl at this point may be seen a long tube-like ridge, very similar to the external tube of *Alycaeus*, only that it diminishes from the back forwards. The position of the operculum as regards both this and the lower rim is at the back. It does not seem to me at all clear, for what purposes this internal formation has been created. Possibly the extremity of the foot carrying the operculum travels along the screw-like thread, and the ridge above may give the necessary guiding surface to the operculum when the animal issues from its shell. The operculum, situated as it is so far from the aperture, would require some fulcrum or guiding edges, to pass it evenly and smoothly out of the shell.

On plate ii, in figure 3, I have endeavoured to shew the position of the operculum and constriction from the front of *Dipl. pachycheilus*; in fig. 4, the interior of the shell from the left hand side, where *t* represents the spiral rim; *c*, the position of the constriction; *r*, the upper ridge or tube.

Figs. 5 and 5a, are respectively a side view and plan of the relative positions of the operculum and the commencement of the spiral rim.

In fig. 1a, pl. I, I have shewn the position of the constriction in *D. Jatingana*, situated behind the aperture, a considerable distance, and as yet peculiar to this species alone.

Fig. 6 is the lingual ribbon of *D. pachycheilus*, B s.,—the outer laterals are very small and indistinct.

In order to compare the lingual ribbon of *Diplommatina* with those of other allied genera, I have added figures of the dentition of an *Alycaeus* and of a *Pupina*, (vide fig. 7 and 8, pl. II).

Fig. 7, is taken from a large form closely allied, or identical with *A. Ingrami*, B e n s.; fig. 8 represents the dentition of *P. imbricifera*, B e n s o n.

In *Alycaeus* the form of arrangement is  $\frac{3}{4} \frac{3}{5} \frac{1}{5} \frac{3}{5} \frac{3}{4}$ , all the uncini being 5 cusped, with the exception of the outer on which I could only detect 4. It may be noticed that in the drawing the 5 cusps are not shewn in every instance, but it must be remembered that they can only thus be seen in certain positions, or from certain points of view



the toothed edges being strongly curved, both longitudinally and laterally. In figure 7a, 7b the uncini are drawn on a larger scale, shewing the tube-like form of the roof and its base. The uncini of this species are peculiarly spreading and fan-like, especially on the 1st and 2nd laterals.

The lingual ribbon of *Pupina* differs considerably in form from the last,  $\frac{3}{4} \frac{3}{4} \frac{1}{3} \frac{3}{4}$ . The laterals are four-cusped, the medial tooth only being tri-cusped, and after a long search I could not detect more than as given above. The breadth of the ribbon was .008 inch. *P. imbricifera* is the only species that I have met with in these hills. Specimens from the Burrail hills are smaller and more tumid than those from the Khasi hills, but differ in no other respect; the animal is quite black, of the usual *Cyclophoroid* form, tentacles moderately long and slender.

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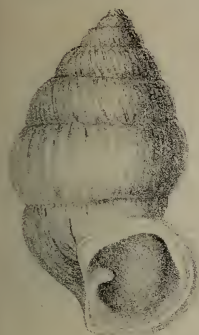
CONTRIBUTIONS TO INDIAN MALACOLOGY, No. XI.—DESCRIPTIONS OF NEW SPECIES OF *Paludomus*, *Cremnoconchus*, *Cyclostoma* and of *Helicidae* from various parts of India, — by WILLIAM T. BLANFORD, A. R. S. M., F. G. S., &c.

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The following species are from various collections. For specimens from the Khasi and Garo hills, and from Cachar, I am indebted to Major Godwin-Austen. Those from Western and Southern India have been found by Major Beddome, Major Evezard, Mr. Fairbank and myself.

1. *Paludomus reticulata*, *sp. nov.*, Pl. III, fig. 1.

*Testa imperforata, globosa, solida, albida, epidermide fusca induta, liris reticulatis spiralibus et verticalibus decussato-sculpta, lilarum intersectionibus nodiferis. Spira brevis; apice eroso; sutura profunda. Anfr. superst. 2-3 convexi, ultimus infra suturam tumidus. Apertura ovalis, postice vix subangulata, parum obliqua, intus cærulescens; peristoma tenue, acutum fere rectum, ad basin vix retrocurvatum, intus minute corrugatum, margine basali expansiusculo; columellâ mediocri. Operc.*



1.



1.a.



1.b.



2.



2.a.



2.b.



3.



3.a.



3.b.



4.



4.a.



5.

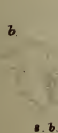
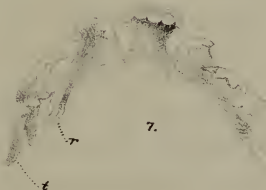
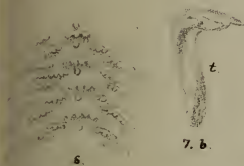
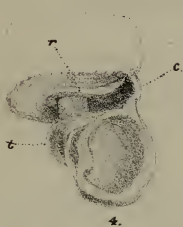
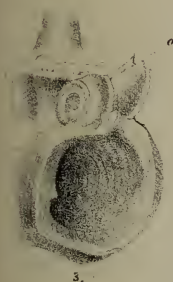


5.a.



5.b.

1. *Dipl. Jatingana*, 3. *Dipl. Sheriainensis*.  
 2. — *depressa*, 4. — *polypleuris*, var.  
 5. *Dipl. parvula*.



1. *Diplom. insignis*; 2. *Diplom. tumida*.

3-5. *Dipl. pachycheilus*, vide p. 7.

6. Lingual ribbon of same, vide p. 8.

7. " " of an *Alycaeus* (like *Ingrami*), p. 8.

8. " " " *Pup. imbricifera*, *Sens.*, p. 8.